Bay Area Air Quality Management District

Draft Staff Report
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Appendix C

Methodology for Derivation of Toxic Air Contaminant Trigger Levels

C. Methodology for Derivation of Toxic Air Contaminant Trigger Levels

The TAC trigger levels given in Table 2-5-1 are used to determine the need for an HRSA for projects involving new and modified sources. The TAC trigger levels are also used: (1) to establish permit requirements for certain sources that may otherwise qualify for permit exemptions, (2) as part of the applicability of the accelerated permit program, and (3) in determining permit fees. The TAC trigger levels are considered to be reasonable de minimis emission rates for use at a project-level. Projects with emissions below the TAC trigger levels are unlikely to cause, or contribute significantly to, adverse health risks.

The TAC trigger levels were calculated using: (1) target health risk levels that are considered de minimis for project-level risks, (2) OEHHA health effect values, (3) generally conservative modeling procedures which establish the extent to which a TAC is transported and dispersed in the atmosphere after its release from the source, and (4) health-protective assumptions regarding the extent of an individual's exposure to an emitted TAC.

C.1 Target Health Risk Levels

For chronic health risk, a lifetime cancer risk of 1.0 in a million (10^{-6}) and a non-cancer hazard index of 0.2, were used as the target health risk levels to derive the chronic trigger levels. These are the risk thresholds at which TBACT is required under the proposed Regulation 2, Rule 5. The target cancer risk is unchanged from what was used to derive the trigger levels in the existing REP. The target non-cancer health risk is 20 percent of what was used to derive the trigger levels in the existing REP (i.e., these were based on a target hazard index of 1.0).

Where applicable, the chronic trigger level represents the lesser of the trigger levels determined based on the cancer and non-cancer target health risk levels. In general, for compounds that have potential cancer and non-cancer adverse health effects, the chronic trigger level presented in Table 2-5-1 is based on the potential carcinogenic health effect, which is more health-protective.

For acute health risk, a hazard index of 1.0 was used as the target health risk level. This is an impact equal to the acute REL, which represents an air concentration that is not likely to cause adverse effects in a human population, including sensitive subgroups, exposed on an intermittent basis for a one-hour period. It is also the project risk limit required under the proposed Regulation 2, Rule 5. The proposed acute trigger levels in Table 2-5-1 are new; the existing REP contains only chronic trigger levels.

C.2 Health Effect Values

The proposed Table 2-5-1 incorporates the most recent health effect values adopted by OEHHA for use in the ATHS Program. These include CPFs for carcinogens, and RELs for non-carcinogenic health effects. Some TACs do not appear on Table 2-5-1 because there may not be sufficient data available for OEHHA to establish a CPF or REL. The District intends on periodically updating Table 2-5-1 to reflect new or revised health effect values adopted by OEHHA.

Although OEHHA has provided RELs for CO, NO_2, and SO_2, using the State Ambient Air Quality Standards, trigger levels were not developed for these criteria pollutants because they are regulated in other District programs. In addition, although OEHHA has developed toxicity criteria for "gasoline vapors", a trigger level was not developed for this compound grouping because individual components of gasoline (e.g., benzene) are evaluated separately. Moreover, gasoline has been reformulated since the development of the REL for gasoline vapors, so the use of this REL is considered outdated.

The trigger levels for polycyclic aromatic hydrocarbons (PAHs) and polychlorinated dibenzo-p-dioxins (PCDDs, or dioxins) and polychlorinated dibenzofurans (PCDFs, or furans), were based on compound groupings. The trigger levels were expressed as B(a)P-equivalent and TCDD-equivalents in order to address cumulative exposures to applicable PAH and PCDD/PCDF congeners, respectively.

Although acute severity exposure levels (e.g., mild, severe, and life-threatening effects) have been identified for each acute REL, all acute trigger levels were developed based on the same exposure assumptions and target risk levels, regardless of the severity of the adverse health effect corresponding to the acute REL.

C.3 Modeling Procedures

The trigger levels in Table 2-5-1 are based on the same screening-level dispersion modeling procedure that was used to develop the trigger levels in the existing REP. This involves the use of a cavity effects screening procedure that relates emission rate to one-hour average ambient air concentrations (i.e., dispersion factors, or Chi/Q) where dispersion is affected by aerodynamic downwash from a nearby building. The cavity region occurs immediately adjacent to the lee side of the building and is often the "worst-case" dispersion scenario where receptor areas are in close proximity to the source being evaluated. The cavity effects equation used to derive the trigger levels is provided in EPA's Screening Procedures for Estimating the Air Quality Impact of Stationary Sources (EPA, 1992), and is incorporated into the EPA SCREEN3 model (EPA, 1995).

The cavity effects equation requires the selection of the crosswind building area and the average wind speed. A value of 92.7 square meters was used for the crosswind

building area (e.g., a building 25 feet high x 40 feet wide). The average wind speed was taken to be 2 meters per second, based on EPA screening modeling guidelines. For use in determining chronic trigger levels, a multiplying factor representing the ratio between annual average and one-hour maximum concentrations of 0.1 was used. This is the high-end value of the range of multiplying factors provided in EPA screening modeling guidelines (EPA, 1982).

All acute trigger levels were conservatively based on maximum one-hour average dispersion factors regardless of the averaging period of the REL. (Most RELs are based on one-hour exposures, but some are based on exposures averaged over several hours [e.g., 4-, 6-, and 7-hour] for reproductive/developmental endpoints).

C.4 Exposure Assumptions

OEHHA is currently evaluating further refinements to the exposure assessment assumptions that are provided in the 2003 HRA Guidelines, which are likely to result in significant changes to exposure estimates for the breathing (i.e., inhalation) exposure pathway. Therefore, the trigger levels presented in Table 2-5-1 are based on inhalation exposure assumptions provided in the 1993 HRA Guidelines. A default breathing rate of 286 L/kg-day was used, based on a daily respiration rate of 20 cubic meters and a 70 kg body weight. An exposure frequency of 365 days/yr was used, along with an exposure duration of 70 years. The District intends on revising the trigger levels after the State recommendations regarding default inhalation exposure parameters are finalized.

OEHHA has identified a list of substances that require multi-pathway risk analysis, which are listed in Table C-1. The trigger levels for these compounds have been determined based on the minimum residential multi-pathway exposure routes, which are inhalation, incidental soil ingestion, and dermal contact. For dioxins, furans, and PCBs, the breast-milk consumption pathway was also included per OEHHA recommendations. The multi-pathway exposure assessment was performed using CARB's Hotspots Analysis and Reporting Program (HARP) (Version Beta 19.01.27) using default assumptions. A deposition rate of 0.02 meters per second for "controlled sources" was selected for use in HARP for the multi-pathway risk analyses.

Table C-1 Substances with Trigger Levels Based on Multi-pathway Exposures

Substance	
4,4'-Methylene dianiline	Chromium VI & compounds
Creosotes	Inorganic arsenic & compounds
Diethylhexylphthalate	Beryllium & compounds
Hexachlorocyclohexanes	Lead & compounds
PAHs	Mercury & compounds
PCBs	Nickel & compounds
Cadmium & compounds	Dioxins & Furans

C.5 Trigger Level Calculations

The acute trigger levels presented in Table 2-5-1 were calculated as follows:

*Acute TL = Acute REL * 1.5 * A * u * UCF * THI*

where:

Acute TL = Acute Trigger Level (pounds/hour)

Acute REL = Acute Reference Exposure Level (chemical-specific - $\mu g/m^3$)

A = Building Cross-Sectional Area [92.7 m^2 (25 feet height x 40 feet width x 40 feet length)]

u = Wind Speed [2 m/sec]

UCF = Units Conversion Factor [(lb/453,590,000 μg) * (3,600 sec/hr)] = 7.9E-06

THI = Target Hazard Index [1.0]

The chronic trigger levels in Table 2-5-1 represent the lesser of the trigger levels calculated for a carcinogenic and non-carcinogenic adverse health effect. Chronic trigger levels based on non-carcinogenic adverse health effects were calculated for the inhalation exposure pathway, and multi-pathway analyses (via HARP) using the following equation:

$$Chronic\ TL_{nc} = Chronic\ REL * 10 * 1.5 * A * u * UCF * THI$$

where:

Chronic TL_{nc} = Chronic Trigger Level – non-cancer risk (pounds/year)

Chronic REL = Chronic Reference Exposure Level (chemical-specific – $\mu g/m^3$; where applicable, chronic RELs were adjusted via HARP to include impacts from multi-pathway exposure)

10 = conversion factor used to convert from an annual average concentration to a 1-hour average concentration

A = Building Cross-Sectional Area [92.7 m^2 (25 feet height x 40 feet width x 40 feet length)]

u = Wind Speed [2 m/sec]

UCF = Units Conversion Factor [(lb/453,590,000 μg) * (31,536,000 sec/day)] = 6.95E-02

THI = Target Hazard Index [0.2]

Chronic trigger levels based on carcinogenic health effects were calculated for the inhalation exposure pathway, and multi-pathway analyses (via HARP) using the following equation:

$$Chronic\ TL_{cr} = 1 / (CPF * BR * EF * 10 * 1.5 * A * u * UCF * TCR$$

where:

Chronic TL_{cr} = Chronic Trigger Level – cancer risk (pounds/year)

CPF = Cancer Potency Factor (chemical – specific, $(mg/kg\text{-}day)^{-1}$; where applicable, CPFs were adjusted via HARP to include impacts from multi-pathway exposure)

BR = Breathing Rate (286 L/kg-day)

EF = Exposure Frequency (365 days/year)

10 = conversion factor used to convert from an annual average concentration to a 1-hour average concentration

A = Building Cross-Sectional Area [92.7 m^2 (25 feet height x 40 feet width x 40 feet length)]

u = Wind Speed [2 m/sec]

UCF = Units Conversion Factor [(lb/453,590 mg) * (1,000 L/m^3) * (31,536,000 sec/day)] = 69,525

THR = Target Cancer Risk [10^{-6}]

Table C-2 presents a comparison of the chronic trigger levels listed in the existing REP and Table 2-5-1. Where a difference in trigger level is identified, the basis for the chemical-specific modification is noted. Differences in trigger levels may be due to one or more of the following factors: (1) revised chemical-specific health effects values (e.g., CPFs and/or RELs) in the 2003 HRA Guidelines relative to earlier guideline documents, (2) the use of a revised target hazard index of 0.2 (rather than 1.0 used in the REP) for non-cancer risks, (3) changes in default multi-pathway exposure parameters or calculations included in HARP relative to the CARB HRA Program (which was previously used), and/or (4) the use of cancer potency factors instead of unit risk factors in the calculation of trigger levels. With respect to the last factor, the trigger levels in the REP (for carcinogens) were calculated using unit risk factors, whereas the trigger levels in Table 2-5-1 were calculated based on cancer potency factors (as now recommended by OEHHA). In general, if a chemical-specific unit risk factor and CPF are derived from the same data, they represent the same value, but are only expressed in different units of measure [unit risk factors are expressed as $(\mu g/m^3)^{-1}$ and assume a daily breathing rate of 20 m^3 and body weight of 70 kg; CPFs are expressed as $(mg/kg\text{-}day)^{-1}$]. However, slight differences can be introduced when the values are rounded for presentation in tables. Therefore, although a chemical-specific health effect value may not have been revised, the use of the CPF instead of the URF may result in a difference in the trigger level of up to about six percent.

Table C-2 Summary of Chronic Trigger Level Revisions

Chemical	Chronic Trigger Levels (pounds/year)		Change from REP[a]	Notes
	REP[a]	Table 2-5-1[b]		
Acetaldehyde	7.2E+01	6.8E+01	-6%	l
Acetamide	9.7E+00	9.7E+00	None	
Acrolein	3.9E+00	2.3E+00	-41%	a, b
Acrylamide	1.5E-01	1.5E-01	None	
Acrylic acid	NA	3.9E+01	NA	
Acrylonitrile	6.7E-01	6.8E-01	+1%	i
Allyl chloride	3.3E+01	3.2E+01	-3%	i
Aminoanthraquinone, 2-	2.1E+01	2.0E+01	-5%	i
Ammonia	1.9E+04	7.7E+03	-59%	a, b
Aniline	1.2E+02	3.9E+01	-68%	g
Antimony compounds	NA	7.7E+00	NA	
antimony trioxide	NA	7.7E+00	NA	
Arsenic and compounds (inorganic)	2.5E-02	1.2E-02	-52%	h
Arsine	NA	1.9E+00	NA	
Asbestos	3.0E-03	3.0E-03	None	
Benzene	6.7E+00	6.8E+00	+1%	i
Benzidine (and its salts)	1.4E-03	1.4E-03	None	
benzidine based dyes	NA	1.4E-03	NA	
direct black 38	NA	1.4E-03	NA	
direct blue 6	NA	1.4E-03	NA	
direct brown 95 (technical grade)	NA	1.4E-03	NA	
Benzyl chloride	3.9E+00	4.0E+00	+3%	i
Beryllium and compounds	1.4E-02	8.1E-02	+479%	h, j
Bis(2-chloroethyl)ether (Dichloroethyl ether)	2.7E-01	2.7E-01	None	
Bis(chloromethyl)ether	1.5E-02	1.5E-02	None	
Bromine and compounds	3.3E+02	6.6E+01	-80%	a
bromine pentafluoride	NA	6.6E+01	NA	
hydrogen bromide	4.6E+03	9.3E+02	-80%	a
potassium bromate	1.4E+00	1.4E+00	None	
Butadiene, 1,3-	1.1E+00	1.1E+00	None	
Cadmium and compounds	4.6E-02	4.5E-02	-2%	i
Carbon disulfide	1.4E+04	3.1E+04	+121%	a, b, d
Carbon tetrachloride (Tetrachloromethane)	4.6E+00	4.5E+00	-2%	i
Chlorinated paraffins	7.7E+00	7.6E+00	-1%	i
Chlorine	1.4E+03	7.7E+00	-99%	a, c
Chlorine dioxide	NA	2.3E+01	NA	
Chloro-o-phenylenediamine, 4-	4.2E+01	4.2E+01	None	
Chloroacetophenone, 2-	NA	1.2E+00	NA	
Chlorobenzene	1.4E+04	3.9E+04	+179%	a, b
Chlorodifluoromethane (Freon 22) [see Fluorocarbons]				

Chemical	Chronic Trigger Levels (pounds/year)		Change from REP[a]	Notes
	REP[a]	Table 2-5-1[b]		
Chlorofluorocarbons [see Fluorocarbons]				
Chloroform	3.6E+01	3.6E+01	None	
Chlorophenol, 2-	3.5E+03	7.0E+02	-80%	a
Chloropicrin	7.7E+02	1.5E+01	-98%	a, c
Chloroprene	NA	3.9E+01	NA	
Chloro-o-toluidine, p-	2.5E+00	2.5E+00	None	
Chromium, (hexavalent, 6+)	1.3E-03	1.3E-03	None	
barium chromate	NA	1.3E-03	NA	
calcium chromate	NA	1.3E-03	NA	
lead chromate	NA	1.3E-03	NA	
sodium dichromate	NA	1.3E-03	NA	
strontium chromate	NA	1.3E-03	NA	
Chromium trioxide (as chromic acid mist)	NA	1.3E-03	NA	
Copper and compounds	4.6E+02	9.3E+01	-80%	a
Cresidine, p-	4.4E+00	4.5E+00	+2%	i
Cresols (m-, o-, p-)	3.5E+04	2.3E+04	-34%	a, b
Cupferron	3.1E+00	3.1E+00	None	
Cyanide and compounds (inorganic)	NA	3.5E+02	NA	
hydrogen cyanide (hydrocyanic acid)	1.4E+04	3.5E+02	-98%	a, c
Diaminoanisole, 2,4-	2.9E+01	2.9E+01	None	
Diaminotoluene, 2,4-	1.8E-01	1.7E-01	-6%	i
Dibromo-3-chloropropane, 1,2- (DBCP)	9.7E-02	9.7E-02	None	
Dichlorobenzene, 1,4-	1.8E+01	1.7E+01	-6%	i
Dichlorobenzidine, 3,3-	5.6E-01	5.6E-01	None	
Dichloroethane, 1,1- (Ethylidene dichloride)	1.2E+02	1.2E+02	None	
Dichloroethylene, 1,1- [see vinylidene chloride]				
Diesel exhaust particulate matter	6.4E-01	6.1E-01	-5%	i
Diethanolamine	NA	1.2E+02	NA	
Di(2-ethylhexyl)phthalate (DEHP)	8.1E+01	7.0E+01	-14%	h, i
Dimethylamine	3.8E+02	7.7E+01	-80%	a
Dimethylaminoazobenzene, p-	1.5E-01	1.5E-01	None	
Dimethyl formamide, N,N-	NA	3.1E+03	NA	
Dinitrotoluene, 2,4-	2.1E+00	2.2E+00	+5%	i
Dioxane, 1,4- (1,4-diethylene dioxide)	2.5E+01	2.5E+01	None	
Epichlorohydrin (1-chloro-2,3-epoxypropane)	8.3E+00	8.5E+00	+2%	i
Epoxybutane, 1,2-	NA	7.7E+02	NA	
Ethyl acrylate	9.3E+03	1.9E+03	-80%	a
Ethyl benzene	NA	7.7E+04	NA	
Ethyl chloride (chloroethane)	1.9E+06	1.2E+06	-37%	a, b
Ethylene dibromide (1,2-dibromoethane)	2.7E+00	2.7E+00	None	
Ethylene dichloride (1,2-dichloroethane)	8.7E+00	9.4E+00	+8%	e, i
Ethylene glycol	NA	1.5E+04	NA	
Ethylene glycol butyl ether – EGBE [see Glycol ethers]				

Chemical	Chronic Trigger Levels (pounds/year)		Change from REP[a]	Notes
	REP[a]	Table 2-5-1[b]		
Ethylene oxide (1,2-epoxyethane)	2.1E+00	2.2E+00	+5%	i
Ethylene thiourea	1.5E+01	1.5E+01	None	
Fluorides and compounds	NA	2.3E+02	NA	
hydrogen fluoride (hydrofluoric acid)	1.1E+03	2.3E+02	-79%	a
Fluorocarbons (chlorinated)	1.4E+05	2.7E+04	-81%	a
chlorinated fluorocarbon (CFC-113)	1.4E+05	2.7E+04	-81%	a
chlorodifluoromethane (Freon 22)	NA	1.9E+06	NA	
dichlorofluoromethane (Freon 21)	NA	2.7E+04	NA	
trichlorofluoromethane (Freon 11)	NA	2.7E+04	NA	
fluorocarbons (brominated)	NA	2.7E+04	NA	
Formaldehyde	3.3E+01	3.2E+01	-3%	i
Freons [see Fluorocarbons]				
Glutaraldehyde	3.3E+02	3.1E+00	-99%	a, c
Glycol ethers				
ethylene glycol butyl ether – EGBE (2-butoxy ethanol; butyl cellosolve)	3.9E+03	7.7E+02	-80%	a
ethylene glycol ethyl ether – EGEE (2-ethoxy ethanol; cellosolve)	3.9E+04	2.7E+03	-93%	a, c
ethylene glycol ethyl ether acetate – EGEEA (2-ethoxyethyl acetate; cellosolve acetate)	1.2E+04	1.4E+04	+17%	a, b
ethylene glycol methyl ether – EGME (2-methoxy ethanol; methyl cellosolve)	3.9E+03	2.3E+03	-41%	a, b
ethylene glycol methyl ether acetate – EGMEA (2-methoxyethyl acetate; methyl cellosolve acetate)	1.1E+04	3.5E+03	-68%	a, b
Hexachlorobenzene	3.9E-01	3.8E-01	-3%	i
Hexachlorocyclohexanes (mixed or technical grade)	1.8E-01	1.2E-01	-33%	h
Hexachlorocyclohexane, alpha-	NA	1.2E-01	NA	
Hexachlorocyclohexane, beta-	NA	1.2E-01	NA	
Hexachlorocyclohexane, gamma- (lindane)	NA	4.3E-01	NA	
Hexachlorocyclopentadiene	4.6E+01	9.3E+00	-80%	a
Hexane, n-	8.3E+04	2.7E+05	+225%	a,b,d
Hydrazine	3.9E-02	4.0E-02	+3%	i
Hydrochloric acid (hydrogen chloride)	1.4E+03	3.5E+02	-75%	a, b
Hydrogen bromide [see bromine & compounds]				
Hydrogen cyanide (hydrocyanic acid) [see cyanide & compounds]				
Hydrogen fluoride (hydrofluoric acid) [see fluorides & compounds]				
Hydrogen sulfide	8.1E+03	3.9E+02	-95%	a, c
Isophorone	6.6E+04	7.7E+04	+17%	a, b, d
Isopropyl alcohol (isopropanol)	4.4E+05	2.7E+05	-39%	a, b, d
Lead and compounds (inorganic)	1.6E+01	4.1E+00	-74%	f
lead acetate	NA	4.1E+00	NA	
lead phosphate	NA	4.1E+00	NA	
lead subacetate	NA	4.1E+00	NA	

Chemical	Chronic Trigger Levels (pounds/year)		Change from REP[a]	Notes
	REP[a]	Table 2-5-1[b]		
Lindane [see hexachlorocyclohexane, gamma]				
Maleic anhydride	4.6E+02	2.7E+01	-94%	a, c
Manganese and compounds	7.7E+01	7.7E+00	-90%	a, c
Mercury and compounds (inorganic)	5.8E+01	5.8E-01	-99%	a, c
mercuric chloride	NA	5.8E-01	NA	
Mercury and compounds (organic)				
methyl mercury	1.9E+02	3.9E+01	-79%	a
Methanol (methyl alcohol)	1.2E+05	1.5E+05	+25%	a, b
Methyl bromide (bromomethane)	1.2E+03	1.9E+02	-84%	a, c
Methyl chloroform (1,1,1-trichloroethane)	6.2E+04	3.9E+04	-37%	a, b
Methyl ethyl ketone (MEK) (2-butanone)	1.5E+05	3.9E+04	-74%	a, b
Methyl isocyanate	7.0E+01	3.9E+01	-44%	a, b
Methyl mercury [see mercury & compounds]				
Methyl methacrylate	1.9E+05	3.8E+04	-80%	a
Methyl tertiary-butyl ether (MTBE)	NA	7.4E+02	NA	
Methylene bis (2-chloroaniline), 4,4'- (MOCA)	4.4E-01	4.5E-01	+2%	i
Methylene chloride (dichloromethane)	1.9E+02	1.9E+02	None	
Methylene dianiline, 4,4'- (and its dichloride)	4.2E-01	4.1E-01	-2%	i
Methylene diphenyl isocyanate	1.8E+01	2.7E+01	+50%	a, b
Michler's ketone (4,4'-bis(dimethylamino)benzophenone)	7.7E-01	7.9E-01	+3%	i
Mineral fibers (<1% FREE SILICA)	NA	9.3E+02	NA	
ceramic fibers (man-made)	NA	9.3E+02	NA	
glasswool (man-made fibers)	NA	9.3E+02	NA	
mineral fibers (fine: man-made)	NA	9.3E+02	NA	
rockwool (man-made fibers)	NA	9.3E+02	NA	
slagwool (man-made fibers)	NA	9.3E+02	NA	
Naphthalene [see polycylcic aromatic hydrocarbons]				
Nickel and compounds	7.3E-01	7.4E-01	+1%	i
nickel acetate	NA	7.4E-01	NA	
nickel carbonate	NA	7.4E-01	NA	
nickel carbonyl	NA	7.4E-01	NA	
nickel hydroxide	NA	7.4E-01	NA	
nickelocene	NA	7.4E-01	NA	
nickel oxide	NA	7.4E-01	NA	
nickel refinery dust from the pyrometallurgical process	NA	7.4E-01	NA	
nickel subsulfide	NA	7.4E-01	NA	
Nitric acid	2.3E+03	NA	NA	
Nitrobenzene	3.3E+02	6.6E+01	-80%	a
Nitropropane, 2-	3.9E+03	7.7E+02	-80%	a
Nitroso-n-dibutylamine, N-	1.6E-03	6.1E-02	+3,713%	e, i *
Nitrosodi-n-propylamine, n-	9.7E-02	9.7E-02	None	
Nitrosodiethylamine, n-	1.9E-02	1.9E-02	None	

Chemical	Chronic Trigger Levels (pounds/year)		Change from REP[a]	Notes
	REP[a]	Table 2-5-1[b]		
Nitrosodimethylamine, n-	4.2E-02	4.2E-02	None	
Nitrosodiphenylamine, n-	7.3E+01	7.5E+01	+3%	i
Nitroso-n-methylethylamine, n-	3.1E-02	3.1E-02	None	
Nitrosomorpholine, n-	1.0E-01	1.0E-01	None	
Nitrosopiperidine, n-	7.1E-02	7.2E-02	+1%	i
Nitrosopyrrolidine, n-	3.3E-01	3.2E-01	-3%	i
Nitrosodiphenylamine, p-	3.1E+01	3.1E+01	None	
Ozone	NA	7.0E+03	NA	
Pentachlorophenol	3.8E+01	7.7E+00	-80%	g
Perchloroethylene (tetrachloroethylene)	3.3E+01	3.2E+01	-3%	i
Phenol	8.7E+03	7.7E+03	-11%	a, b
Phosgene	1.8E+02	NA	NA	
Phosphine	1.9E+03	3.1E+01	-98%	a, c
Phosphoric acid	4.6E+02	2.7E+02	-41%	a, b, d
Phosphorus (white)	1.4E+01	2.7E+00	-81%	a
Phthalic anhydride	1.4E+06	7.7E+02	-99.95%	a, c
PCBs (polychlorinated biphenyls) [low risk]	NA	9.9E-01	NA	
PCBs (polychlorinated biphenyls) [high risk]	6.8E-03	3.5E-02	+415%	e, h
Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) (as 2,3,7,8-PCDD equivalent)	1.2E-06	6.3E-07	-48%	h
Polycyclic aromatic hydrocarbon (PAH) (as B(a)P-equivalent)	4.4E-02	1.1E-02	-75%	e, h
naphthalene	2.7E+02	3.5E+02	+30%	a, c **
Potassium bromate [see bromine & compounds]				
Propane sultone, 1,3-	2.7E-01	2.8E-01	+4%	i
Propylene (propene)	NA	1.2E+05	NA	
Propylene glycol monomethyl ether	NA	2.7E+05	NA	
Propylene oxide	5.2E+01	5.2E+01	None	
Selenium and compounds	9.7E+01	7.7E+02	+694%	a, b
selenium sulfide	NA	7.7E+02	NA	
Sodium hydroxide	9.3E+02	1.9E+02	-80%	a
Styrene	1.4E+05	3.5E+04	-75%	a, b
Sulfates	NA	9.7E+02	NA	
Sulfuric acid and oleum	NA	3.9E+01	NA	
sulfuric acid	NA	3.9E+01	NA	
oleum	NA	3.9E+01	NA	
Tetrachloroethane, 1,1,2,2-	3.3E+00	3.4E+00	+3%	i
Tetrachlorophenols	1.7E+04	3.4E+03	-80%	a
Thioacetamide	1.1E-01	1.1E-01	None	
Toluene	3.9E+04	1.2E+04	-69%	a, b
Toluene diisocyantates	1.8E+01	2.7E+00	-85%	g
toluene-2,4-diisocyanate	1.8E+01	2.7E+00	-85%	g
toluene-2,6-diisocyanate	1.8E+01	2.7E+00	-85%	g
Trichloroethane, 1,1,1- (see methyl chloroform)				

Chemical	Chronic Trigger Levels (pounds/year)		Change from REP[a]	Notes
	REP[a]	Table 2-5-1[b]		
Trichloroethane, 1,1,2- (vinyl trichloride)	1.2E+01	1.2E+01	None	
Trichloroethylene	9.7E+01	9.7E+01	None	
Trichlorophenol, 2,4,6-	9.7E+00	9.7E+00	None	
Triethylamine	NA	7.7E+03	NA	
Urethane (ethyl carbamate)	6.6E-01	6.8E-01	+3%	i
Vinyl acetate	NA	7.7E+03	NA	
Vinyl bromide	NA	2.7E+02	NA	
Vinyl chloride (chloroethylene)	2.5E+00	2.5E+00	None	
Vinylidene chloride (1,1-dichloroethylene)	6.2E+03	2.7E+03	-56%	a, b
Xylenes (mixed isomers)	5.8E+04	2.7E+04	-53%	a, b
m-xylene	NA	2.7E+04	NA	
o-xylene	NA	2.7E+04	NA	
p-xylene	NA	2.7E+04	NA	
Zinc and compounds	6.8E+03	1.4E+03	-79%	a
zinc oxide	NA	1.4E+03	NA	

[a] = BAAQMD Air Toxics Risk Evaluation Procedure (REP), Tables 1 and 2 (February 3, 2000)
[b] = BAAQMD Proposed Regulation 2, Rule 5 (2003)

Notes (Identify the Basis for Change in Trigger Levels from the REP):

a = Decrease Target Hazard Index from 1.0 to 0.2
b = Increase in REL
c = Decrease in REL
d = REP Trigger Level derived from TLV, Table 2-5-1 Trigger Level derived from REL
e = Decrease in URF
f = REP Trigger Level based on CAAQS, Table 2-5-1 Trigger Level based on CPF
g = REP Trigger Level derived from URF, Table 2-5-1 Trigger Level derived from REL
h = Multi-pathway exposure parameters revised
i = REP Trigger Level derived from URF, Table 2-5-1 Trigger Level derived from CPF
j = REP Trigger Level incorporates an oral CPF; currently, no oral CPF is available
* = REP Trigger Level derived from incorrect URF
** = Calculation error in REP Trigger Level